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Introduction

The purpose of this briefing is to provide an update on night vision goggle training conducted in the Marine Corps and Navy Night Imaging and Threat Evaluation (NITE) Lab training facilities, and to describe changes in the mechanism in which courseware and instruction is standardized.

Background

The NITE Lab concept evolved secondary to a series of USMC NVG-related mishaps in the early 1980s. Marine Aviation Weapons and Tactics Squadron One (MAWTS-1) was tasked to develop a method of NVG training that would better prepare aircrew for flying with goggles. The result was the creation of the NITE Lab concept. Initial planning and evaluation of the training content included a LASER threat simulation (hence the "threat evaluation" portion of the name). The threat simulation portion was eventually eliminated but other threat training has since been incorporated (e.g., LASER Safety, TOPSCENE introduction, etc.). Eventually, NITE Lab facilities were placed in locations where initial NVG flight training was being conducted.

NITE Lab Overview

A NITE Lab, in general, consists of a classroom area for academic instruction, a terrain board for demonstrating NVG-specific effects, and an eyelane for teaching NVG adjustment procedures. The different components can be co-located in a single room or separated into different rooms depending on the available space.

a. Classroom. Academics are provided using the latest in audiovisual capability. Some lessons are taught using slides generated by computer (e.g., Power Point) or by CD-ROM. Video is used extensively to support the slide presentations and is shown using various modes (e.g., videotape, videodisc, CD-ROM, etc.).

b. Eyelane. An eyelane provides a space for instructors to more easily and effectively teach NVG adjustment procedures. An ANV-20/20 NVD Infinity Focus unit is also demonstrated in order to teach students how to use the device, but it does not take the place of the eyelane. In addition to adjustment procedures, the eyelane is used for NVG performance demonstrations (e.g., illumination versus contrast), compatible versus incompatible lighting demonstrations and the demonstration of various devices used during NVG operations (e.g., IR signal devices, IR LASER pointers, etc.).

c. Terrain Board. The use of video provides for a means for demonstrating a wide range of NVG effects and can demonstrate many things not possible on a terrain board. However, many of the visual effects vital for students to understand (e.g., illumination level changes, shadowing, lunar azimuth, cultural lighting effects, etc.) are best portrayed while viewing a scene using the same equipment with which they will fly. Consequently, the terrain board continues to provide the best means of demonstrating and reinforcing many of the important effects determined from mishaps and operational lessons learned.

Standardization of Sensor Ground Training

In an effort to standardize NVG and other sensor ground training, the Chief of Naval Operations (CNO) and the Marine Corps Combat Development Command (MCCDC)/Training and Education designated the Commanding Officer (CO) of MAWTS-1 as the Aviation Training Model manager (ATMM) for both USN and USMC Sensor Ground Training. The MAWTS-1 Aerospace Medical Safety Officer (AMSO) was subsequently identified as the ATMM Project Officer, representing the CO for management of the training program. As a result, responsibility for the standardization of USN and USMC sensor ground training now goes through a single point of contact. Since most of the ground training currently conducted concerns the use of NVGs, many of the efforts and much of the curriculum revolves around goggle training. However, forward-looking infrared (FLIR) training and TOPSCENE training has recently begun, and training for other sensors will likely be incorporated as they are introduced to the fleet.

ATMM Model Manager Responsibilities

To provide direction for the model manager and guidance for those responsible for managing NITE labs, the Standard Operating Procedure (SOP) for Night Imaging and Threat Evaluation (NITE) Lab Training was developed. This document outlines the specifics for insuring that sensor ground training has a mechanism in place that will help the standardization process. As the single point of contact for USN and USMC sensor ground training, the ATMM Model Manager has several duties:

a. Curriculum Development and Standardization. One of the lessons learned from past NVG-related mishaps was the lack of standardized ground training that focused on those issues relevant to safely and effectively using NVGs (e.g., image limitations, weather effects, misperceptions, etc.). Consequently, one of the first large undertakings was to develop a training strategy and then to fund the development and acquisition of the necessary equipment and courseware. Existing courseware was standardized and plans were made for upgrading the content and the methods of delivery. One of the initial results was the development of a NVG Indoctrinational Course that is now used not only by the USN and USMC, but also by the USAF. Other lessons have also been developed and will be described later in the paper.

b. NITE Lab Facility Certification. The ATMM Model Manager makes periodic trips to existing NITE Lab locations to insure academic instruction is meeting expectations, that the various curriculum modules are available and being used, and that the facility has all the necessary supporting hardware. In addition, assistance is provided when establishing a new facility. In both cases, the facilities must meet criteria established in the SOP.

c. Instructor Standardization. An initiative was recently undertaken to help insure the quality of instruction and to help insure that all those responsible for instructing at the NITE Lab locations have been properly prepared. It was decided to establish an "Instructor Course" at MAWTS-1 that would prepare instructors to use the various curriculum modules, and to familiarize them with hardware specific to the Navy and Marine Corps (e.g., NVGs, helmets, mounts, signaling devices, etc.). Additionally, the instructors could be prepared to better support the community to which they are being assigned (e.g., TACAIR versus rotor wing, F/A-18 versus AV-8B, etc.). The first class will be given early next year.

NITE Lab Locations

Currently there are ten USMC NITE Lab locations and seven USN locations:

USMC

MCAS Yuma, AZ
MCAS Camp Pendleton, CA
MCAS Tustin, CA
MCAF Quantico, VA
MCAS New River, NC
MCAS Cherry Point, NC
MCAS Beaufort, SC

USN

NAS North Island, CA
NAS Lemoore, CA
NAS Fallon, NV
NAS Whidbey Island, WA
NAS Oceana, VA
NAS Norfolk, VA
NAS Cecil Field, FL

MCAS Futema, Okinawa
MCBH Kaneohe Bay, HI
MCAS Iwakuni, Japan

Training Curricula

There are several training curricula and lessons currently in use in the NITE Labs and several that will be available within the next few months:

a. Current Courses/Lessons

NVG Indoctrination Course
FLIR Training Course
NVG Refresher Training
MXU-810U to AN/AVS-9 Transition Training

b. Future Courses/Lessons

NITE Lab Instructor Course
NVG Class A Mishap Lessons Learned: Fixed Wing
NVG Class A Lessons Learned: Rotor Wing
NVG/FLIR Sensor Integration
Operational Considerations Update Classes (TACAIR / RW-3)

NVG Indoctrination Course

This is the standardized course that all aircrew will attend prior to beginning NVG flight training. The course contains the following modules:

a. Academics Module. Video is used extensively to demonstrate both the capabilities and limitations associated with the use of NVGs. The module consists of the following six lectures:

Course Introduction
Human Visual System
Introduction to NVGs
Night Environment
NVG Misperceptions and Illusions
Night Operations

b. NVG Pre-Flight and Demonstration Module. This contains at a minimum the following components:

Hands-On Preflight Alignment, Adjustment and Focus Training
NVG Performance Demonstrations
Compatible/Incompatible Lighting Demonstration
Device Demonstrations

c. Terrain Board Demonstration Module. The following is a partial list of the items demonstrated during this module:

Lunar azimuth
Illumination levels
Shadowing
Terrain discrimination
Cultural lighting effects
Environmental effects

FLIR Training Course

This course is designed to augment FLIR courses embedded in the flight syllabuses of existing training, and to provide initial training for aircrew for which FLIR devices have been recently integrated into their platform. Operationally relevant video is used to demonstrate the various teaching points. In addition to the normal discussion of FLIR theory, techniques for flight planning and for adjusting the FLIR imagery for specific purposes (e.g., navigation versus hot spot detection) are provided. LASER safety is also covered. The module consists of the following lectures:

- Introduction and FLIR Theory
- FLIR Systems and Image Optimization
- Operational Considerations and Sensor Integration
- Introduction to LASER Systems and Safety

Other Lessons Currently Available

Other lessons currently available include the following:

a. NVG Refresher Training. This is a "short course" for NVG-experienced aircrew that have been out of the cockpit or have not flown with NVGs for a year or longer. It covers the following topics:

- NVD Technology Update
- NVD Mishap Lessons Learned
- Sensor Integration
- Misperceptions and Illusions
- Terrain Board Demonstrations

b. MXU-810U to AN/AVS-9 Transition Training. This was developed specifically for aircrew transitioning from the use of Cats Eyes NVG to the AN/AVS-9. Differences in goggle design (e.g., indirect versus direct view), adjustment procedures, and image differences (e.g., field of view, low light performance, etc.) make it imperative that these changes are clearly and thoroughly discussed. Training includes the following two briefs:

- Introduction to the AN/AVS-9
- AN/AVS-9 Adjustment Procedures

Future Courses/Lessons

The following are under development and should be available for use in the NITE Lab facilities within the next few months:

a. NITE Lab Instructor Course. This will provide a one week long course that will prepare instructors for NITE Lab assignments. In addition to covering the available curricula and their contents, students will be required to teach a portion of the NVG Indoctrination Course. They will be graded on their performance so that main topical areas and teaching methods may be emphasized to the entire class. All associated hardware will also be demonstrated.

b. NVG Class A Mishap Lessons Learned: Fixed Wing. This lessons covers all but the most recent USN/USMC fixed wing NVG-related Class A mishaps. Each mishap is discussed from an operationally relevant perspective. Lessons learned from each mishap are then combined and trends noted. Finally, guidance is provided to help aircrew avoid similar problems. Video is used when appropriate to demonstrate specific points.

c. NVG Class A Lessons Learned: Rotor Wing. This is similar in organization to the fixed wing lesson. It uses selected helicopter mishaps that represent the most common types associated with the use of

NVGs. Each mishap is discussed from an operationally relevant perspective. Lessons learned from each mishap are then combined and trends noted. Finally, guidance is provided to help aircrew avoid similar problems. Video is used when appropriate to demonstrate specific points.

d. NVG/FLIR Sensor Integration. This lesson was developed to provide information to aircrew that use both NVGs and FLIR sensors. The purpose is to provide a review of the sensors, paying particular attention to their differences, and then to provide guidance for conducting thorough and meaningful preflight planning. Additionally, information is provided to help with in-flight decision-making (e.g., when changes in environmental conditions may favor one sensor over the other, how a change in the target may impact the sensor of choice, etc.).

Integration with Flight Training

Navy and Marine Corps NVG training is conducted both at the schoolhouse and at the squadron level. In all cases however, initial training incorporates the use of a NITE Lab training facility and the standardized curriculum. As such, the curriculum provided is not a "stand-alone" product but is an integral part of the overall training process and part of the entire package of ground, simulator and flight training.

Summary

The NITE Lab concept has continued to evolve since its development in the mid-1980s. Today it is thoroughly integrated with simulator and flight training, all combined to provide aircrew with as much information and practical experience as possible before the first tactical sortie. Additionally, the designation of a model manager position will help insure that quality instruction is provided to all aircrew and that funding will be available to support the necessary efforts.